

## IT IS CLAIMED THAT:

1. An absorbent paper product comprising at least two superposed plies which are cut or precut into a predetermined format and are joined along at least a segment of a peripheral zone in the absence of glueing, and wherein at least one ply of said at least two plies has embossing patterns in a central zone thereof.

2. Product as claimed in claim 1, wherein each of the at least two plies has embossing patterns in the central zone thereof.

3. Product as claimed in claim 2, wherein the embossing patterns in the central zone are the same or different.

4. Product as claimed in claim 1, wherein narrowest parts of the embossing patterns extend inward of the at least two plies.

5. Product as claimed in claim 1, wherein at least one of the at least two plies has marking patterns solely in the peripheral zone.

6. Product as claimed in claim 1, wherein in said peripheral zone, at least one of the at least two plies has marking patterns at least partly the same as the embossing patterns.

7. Product as claimed in claim 5 or claim 6, wherein the marking patterns constitute filigrees.

8. Product as claimed in claim 1, wherein the central zone includes filigree marking patterns.

9. Product as claimed in claim 1, wherein the at least two plies are joined to each other by embossing the central zone of each ply.

10. Product as claimed in claim 1, wherein the central zone of one ply has a decoration including embossed and unembossed portions.

11. A method of manufacturing the paper product as claimed in claim 1, said method comprising

- (a1) embossing a first ply in at least the central zone between a first engraved cylinder and a first mating cylinder,
- (b) superposing a second ply and joining the first ply and the second ply along the peripheral zone by marking between a first engraved or unengraved cylinder in zones corresponding to the peripheral zone and a second hard unengraved or engraved cylinder in zones corresponding to the peripheral zone to mutually join the first ply and the second ply, and
- (c) cutting or precutting the format.

12. Method as claimed in claim 11, wherein between stage (a1) and stage (b), the second ply is embossed between the second cylinder and a second mating cylinder, wherein said second cylinder is engraved at least in the central zone.

13. Method as claimed in either of claim 11 or claim 12, wherein in stage (a1), the first ply is embossed in the central zone between the first cylinder which is engraved and the first mating cylinder, and wherein in stage (b) said first ply and said second ply are marked along at least a portion of the embossing pattern of the first ply in the peripheral zone.

14. Method for manufacturing an absorbent paper product as claimed in claim 9, comprising

- (a1) simultaneously embossing the first ply and the second ply between a first engraved cylinder, which has engraved zones corresponding to the embossing patterns of the central zone, and a first mating cylinder having deforming unengraved surface zones or engraved surface zones that are positioned opposite

the engraved zones of the first engraved cylinder corresponding to the embossing patterns of the central zone,

(b) simultaneously with stage (a1), marking the first ply and the second ply between the first cylinder having engraved or unengraved zones corresponding to the marking patterns of the peripheral zone and the first mating cylinder having unengraved or engraved hard surface zones that are positioned opposite the engraved or unengraved zones of the first cylinder, and

(c) cutting or precutting the format.

15. Apparatus implementing the method as claimed in claim 11, comprising:

-- a first set of cylinders comprising a first hard engraved cylinder and a first deforming mating cylinder, the first engraved cylinder having a first engraved zone corresponding to the embossing patterns of the central zone for the first ply and of an engraving height  $h_3$  and with a second engraved zone corresponding to the marking patterns of the peripheral zone and of an engraving height  $h_2$ , and

-- a second set of cylinders comprising a second hard engraved cylinder and a second deforming mating cylinder, the second engraved cylinder having a first engraved zone corresponding to the embossing patterns of the central zone for the second ply and of an engraving height  $h_3$  and a second unengraved zone corresponding to the peripheral zone and of a height  $h_4$ , a sum of the heights  $h_2$  and  $h_4$  being greater than a sum of the heights  $h_1$  and  $h_3$ .

16. Apparatus implementing the method as claimed in claim 11, comprising:

-- a first set of cylinders comprising a first hard engraved cylinder and a deforming mating cylinder, the first engraved cylinder having a first engraved zone corresponding to the embossing patterns of the central zone for the first ply and of height  $h_1$  or  $h_1'$  and with a second engraved zone corresponding to the marking patterns of the peripheral zone

and of an engraving height  $h_2$  or  $h_2'$ , and

-- a second hard cylinder having a first smooth zone corresponding to the central zone and of height  $h_3$  or  $h_3'$  and a second smooth zone corresponding in part or in whole to the peripheral zone and of height  $h_4$  or  $h_4'$ , said second zone being positioned opposite the engraved zones of the first engraved cylinder corresponding to the embossing patterns, a sum of heights  $h_2$  or  $h_2'$  and of heights  $h_4$  or  $h_4'$  being greater than a sum of heights  $h_1$  or  $h_1'$  and heights  $h_3$  or  $h_3'$ .

17. Apparatus implementing the method as claimed in claim 11, comprising:

-- a first set of cylinders comprising a first hard engraved cylinder and a first deforming mating cylinder, the first engraved cylinder having a first engraved zone corresponding to the embossing patterns of the central zone for the first ply and of engraving height  $h_1''$  and with a second unengraved zone corresponding to the peripheral zone of height  $h_2''$ , where  $h_2''$  is less than  $h_1''$ , and

-- a second hard engraved cylinder having a first smooth zone corresponding to the central zone of height  $h_3''$ , and a second unengraved zone corresponding to the marking patterns of the peripheral zone and of engraving height  $h_4''$ , where  $h_3''$  is less than  $h_4''$ , and a sum of heights  $h_2''$  and  $h_4''$  is greater than a sum of the heights  $h_1''$  and  $h_3''$ .

18. Apparatus as claimed in either of claim 15 or claim 16, wherein the first mating cylinder comprises recessed zones corresponding to the peripheral zone and is used in marking.

19. Apparatus as claimed in claim 15, wherein the second mating cylinder comprises recessed zones corresponding to the peripheral zone.

20. Apparatus implementing the method as claimed in claim 14, comprising:

-- a first hard engraved cylinder having engraved zones corresponding to the embossing patterns of the central zone and

5473

engraved or unengraved zones corresponding to the marking patterns of the peripheral zone, and

-- a first mating cylinder having deforming unengraved surface zones or hard engraved surface zones that are positioned opposite the engraved zones of the central zone, and further have hard unengraved or engraved surface zones which are positioned opposite the engraved or unengraved zones of the first cylinder in the zones corresponding to the marking patterns of the peripheral zone.

*Add*  
*DS*